

A well-designed landscape not only can add beauty to your home but it also can reduce your heating and cooling costs. On average, landscaping for energy efficiency provides enough energy savings to return an initial investment in less than 8 years.

The energy-conserving landscape strategies you use should depend on which region you live in.

The map shows the following climate zones across the United States:

- Cool (Blue):** Includes Alaska, northern Canada, and the northernmost states of the U.S.
- Temperate (Green):** Covers the central and eastern U.S., including the Midwest.
- Hot-Arid (Red):** Covers the southwestern U.S., including California, Nevada, and Arizona.
- Hot-Humid (Orange):** Covers the southern U.S., including Texas, Florida, and the Southeast.

A pink arrow points from the text "The climate in the Midwest is temperate." to the green-colored Midwest region.

**Legend:**

- Cool
- Hot-Arid
- Hot-Humid
- Temperate

- Maximize warming effects of the sun in the winter.
- Maximize shade during the summer.
- Deflect winter winds away from buildings.
- Funnel summer breezes toward the home

## Landscaping and Your Microclimate

The climate immediately surrounding your home is called its microclimate. When landscaping for energy efficiency, it's important to consider your microclimate along with your regional climate.

Your home's microclimate may receive more sun, shade, wind, rain, snow, moisture, and/or dryness than average local conditions. If your home is located on a sunny southern slope, it may have a warm microclimate, even if you live in a cool region. Or, even though you live in a hot-humid region, your home may be situated in a comfortable microclimate because of abundant shade and dry breezes. Nearby bodies of water may increase your site's humidity or decrease its air temperature.

Microclimatic factors also help determine what plants may or may not grow in your landscape

## Landscape Shading

Solar heat absorbed through windows and roofs can increase your air conditioner use. Incorporating shading concepts into your landscape design can help reduce this solar heat gain, reducing your cooling costs.

Shading and evapotranspiration (the process by which a plant actively moves and releases water vapor) from trees can reduce surrounding air temperatures as much as 9° F (5°C). Because cool air settles near the ground, air temperatures directly under trees can be as much as 25°F (14° C) cooler than air temperatures above nearby blacktop.

Using shade effectively requires you to know the size, shape, and location of the moving shadow that your shading device casts. Also, homes in cool regions may never overheat and may not require shading. Therefore, you need to know what landscape shading strategies will work best in your regional climate and your microclimate.

Trees can be selected with appropriate sizes, densities, and shapes for almost any shading application. To block solar heat in the summer but let much of it in during the winter, use deciduous trees. To provide continuous shade or to block heavy winds, use dense evergreen trees or shrubs.

Deciduous trees with high, spreading crowns (i.e., leaves and branches) can be planted to the south of your home to provide maximum summertime roof shading. Trees with crowns lower to the ground are more appropriate to the west, where shade is needed from lower afternoon sun angles. Trees should not be planted on the southern sides of solar-heated homes in cold climates because the branches of these deciduous trees will block some winter sun.

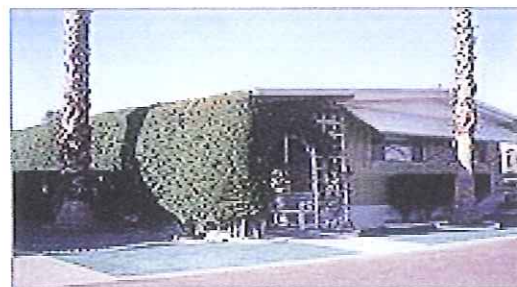
Although a slow-growing tree may require many years of growth before it shades your roof, it will generally live longer than a fast-growing tree. Also, because slow-growing trees often have deeper roots and stronger branches, they are less prone to breakage by windstorms or heavy snow loads. Slow-growing trees can also be more drought resistant than fast-growing trees.

A 6-foot to 8-foot (1.8-meter to 2.4-meter) deciduous tree planted near your home will begin shading windows the first year. Depending on the species and the home, the tree will shade the roof in 5–10 years. If you have an air conditioner, shading the unit can increase its efficiency by as much as 10%.

Trees, shrubs, and groundcover plants can also shade the ground and pavement around the home. This reduces heat radiation and cools the air before it reaches your home's walls and windows. Use a large bush or row of shrubs to shade a patio or driveway. Plant a hedge to shade a sidewalk. Build a trellis for climbing vines to shade a patio area.

Vines can also shade walls during their first growing season. A lattice or trellis with climbing vines, or a planter box with trailing vines, shades the home's perimeter while admitting cooling breezes to the shaded area.

Shrubs planted close to the house will fill in rapidly and begin shading walls and windows within a few years. However, avoid allowing dense foliage to grow immediately next to a home where wetness or continual humidity are problems. Well-landscaped homes in wet areas allow winds to flow around the home, keeping the home and its surrounding soil reasonably dry.



A trellis with a climbing vine can shade a home and allow air circulation.

Photo credit: John Krigger, Saturn Resource.



## Landscape Windbreaks

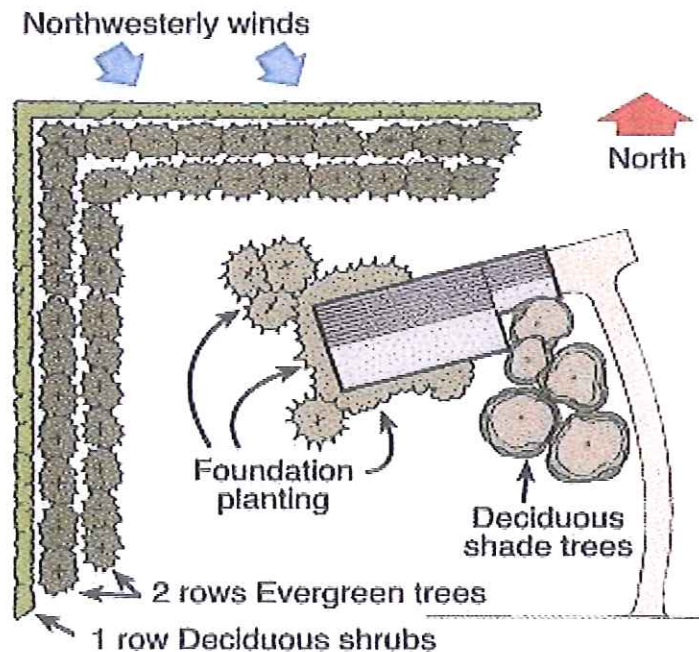
Properly selected and placed landscaping can provide excellent wind protection, or windbreaks, which will reduce heating costs considerably. Furthermore, the benefits from these windbreaks will increase as the trees and shrubs mature.

To use a windbreak effectively, you need to know what landscape strategies will work best in your regional climate and your microclimate.

Basically, a windbreak can lower the wind chill near your home. Wind chill occurs when wind speed lowers the outside temperature. For example, if the outside temperature is 10°F (-12°C) and the wind speed is 20 miles per hour (32 kilometers per hour), the wind chill is -24°F (-31°C). A windbreak will reduce wind speed for a distance of as much as 30 times the windbreak's height. But for maximum protection, plant your windbreak at a distance from your home of two to five times the mature height of the trees.

The best windbreaks block wind close to the ground by using trees and shrubs that have low crowns. Dense evergreen trees and shrubs planted to the north and northwest of the home are the most common type of windbreak. Trees, bushes, and shrubs are often planted together to block or impede wind from ground level to the treetops. Evergreen trees combined with a wall, fence, or earth berm (natural or man-made walls or raised areas of soil) can deflect or lift the wind over the home. Be careful not to plant evergreens too close to your home's south side if you are counting on warmth from the winter sun.

If snow tends to drift in your area, plant low shrubs on the windward side of your windbreak. The shrubs will trap snow before it blows next to your home.



*A typical plan for windbreaks.*

In addition to more distant windbreaks, planting shrubs, bushes, and vines next to your house creates dead air spaces that insulate your home in both winter and summer. Plant so there will be at least 1 foot (30 centimeters) of space between full-grown plants and your home's wall.

Summer winds, especially at night, can have a cooling effect if used for home ventilation. However, if winds are hot and your home is air conditioned all summer, you may want to keep summer winds from circulating near your home.

## Landscaping Water Conservation

You can design a landscape that not only conserves energy but also water. Here is a brief overview of some water-conserving landscaping strategies.

### XERISCAPING

Xeriscaping is a systematic method of promoting water conservation in landscaped areas. It's based on seven principles:

#### Planning and design

Provides direction and guidance, mapping your water and energy conservation strategies, both of which will be dependent upon your regional climate and microclimate.

#### Selecting and zoning plants appropriately

Bases your plant selections and locations on those that will flourish in your regional climate and microclimate.

#### Limiting turf areas

Reduces the use of bluegrass turf, which usually requires a lot of supplemental watering.

#### Improving the soil

Enables soil to better absorb water and to encourage deeper roots.

#### Irrigating efficiently

Encourages using the irrigation method that waters plants in each area most efficiently.

#### Using mulches

Keeps plant roots cool, minimizes evaporation, prevents soil from crusting, and reduces weed growth.

#### Maintaining the landscape

Keeps plants healthy through weeding, pruning, fertilizing, and controlling pests.



Xeriscaping is mostly used in arid regions, but its principles can be used in any region to help conserve water.

### WATERING

If you can determine how much water your plants actually need, then you won't overwater them and waste water. It is important to not only understand a plant's particular watering requirements, but also *evapotranspiration*.

Evapotranspiration is the amount of water that is evaporated from the soil and transpired through the plant's leaves. This amount of water needs to be replaced through watering. If you know your area's Et rate, you can plan the amount of water to be replaced through irrigation. Call your local water district or cooperative extension service and ask about your Et rate. However, your particular microclimate will also affect evapotranspiration in different areas of your yard.

Also, it's best to water or irrigate your plants in the early morning when evaporation rates are low. This also provides plants with water before mid-day when the evaporation rate is the highest.